



EXPERIMENTAL FARM

FOR

SOUTHERN ALBERTA, LETHBRIDGE, ALBERTA

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ALFALFA GROWING IN SOUTHERN ALBERTA.

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Alfalfa growing has been carried on successfully in Southern Alberta for the last few years only, and by but a limited number of farmers. It is, therefore, thought that a few suggestions in regard to its cultivation under conditions as here found, might be acceptable to those who have had no experience in growing this wonderful forage plant, as well as to those who have grown it previously, but under different conditions of climate and soil. There is no alfalfa yet sown on the Experimental Farm, at Lethbridge. The following suggestions are the result of the writer's experience on his private farm near Lethbridge, and of observations in the district. Although these experiences have been limited to the Southern portion of Alberta, doubtless the suggestions given will be useful as a guide to those who wish to attempt alfalfa growing in any part of Alberta, Saskatchewan or Manitoba.*

RAISING ALFALFA WITH AND WITHOUT IRRIGATION.

Alfalfa is a plant that seems particularly fitted for cultivation under irrigation. Not that it requires an excessive amount of moisture to thrive, but rather because it can withstand long seasons of drought, and when moisture is supplied, resumes rapid growth with apparently no setback due to the forced standstill. On the average irrigated farm, it is not usually practicable for the farmer to irrigate every part of his farm just when it should be. There are sure to be certain fields, or parts of fields that cannot be reached just when the crop requires moisture. With most crops this may prove a serious loss, but with alfalfa, it only means a loss of growth while the soil is in a very dry condition. It is during July and August, our hottest months, that this plant makes its most rapid growth, provided the moisture is not exhausted, which does not happen where irrigation is practised.

*The subject of alfalfa-growing has also been treated of in Bulletin No. 46, Experimental Farm Series, copies of which are obtainable on application. An interesting and valuable little book entitled "Alfalfa," by F. D. Coburn, published by the Orange Judd Company, of New York, gives some good ideas in regard to the cultivation and handling of the alfalfa crop, although it deals more particularly with conditions as found in Kansas.

On "dry" farms the second and third cuttings are uncertain from the fact that the growth of the plant up to the first cutting uses up the moisture to a large degree, and unless timely rains come, the soil is often too dry to produce a very heavy crop afterwards. Notwithstanding this fact, there is every encouragement to believe that with proper care in starting, alfalfa can be grown on dry lands, and that more hay can be obtained from it than from any other forage crop, for each season finds more farmers growing it without the aid of irrigation. Every farmer on non-irrigated land should try at least five acres.

LOCATION AND SOIL.

Select land that is well drained, not necessarily land that is high and exposed, but it must not be wet or soggy, and the ground water should never be closer to the surface than 3 feet to 5 feet at any time during the year. This is quite important, as alfalfa is not a plant that will tolerate "wet feet." It prefers a sandy soil with an open subsoil, though this is by no means essential to its success. River bottom land often offers ideal conditions for its growth.

PREPARATION OF THE SOIL.

The land should have been under cultivation a sufficient length of time to have killed out the wild grasses, for it has been found that if these wild grasses come up to any extent during the first or even the second season, in a field sown with alfalfa, they retard the growth of the alfalfa plants, which are easily injured in this way until they become well established. The ideal condition of soil would be to take ground on which potatoes or other hoed crops have been grown, or summer-fallowed land, and prepare the seed-bed by discing or harrowing, or both. If the land is in suitable condition, it is better not to plough in the spring. If such conditions are not obtainable, stubble land may be used by ploughing and preparing a good seed-bed.

INOCULATION.

As alfalfa furnishes a very nutritious hay, being particularly rich in nitrogenous or flesh-producing constituents, and as it yields heavily, it might be expected to impoverish the available nitrogen in the soil and thus diminish its fertility very rapidly. Nature, however, arranges for any heavy draught on the nitrogen of the soil that might accompany the growing of alfalfa or other legumes by the fact that the plants receive nitrogen through the agency of certain bacteria that live on their roots. These bacteria have the ability of using the free nitrogen in the air, present in the soil and passing it on to their host plant, the alfalfa or other legume, in such a form that it enters the general circulation of the plant to build up its various tissues of leaf, stem and root. These bacteria may develop rapidly, and thus store up very large amounts of nitrogen in the legume crop. The decay of the roots, and of the whole plant when ploughed under enriches the soil in nitrogen, and thus it is that the growth of alfalfa, or other legume, invariably increases the soil's fertility. In alfalfa districts in the West, however, it is not customary to plough under any of the top, for it has been found by experience that after a field has been growing alfalfa four or five years or more, the soil is as rich in nitrogen as is desirable for ordinary grain crops.

Sometimes these bacteria, which live on the roots of the alfalfa, are not present in the soil when the field is sown, with the result that the crop grows well the first season, as difficulty in obtaining a stand is rarely met with, but in the summer following, the plants indicate lack of vigour, quite often assuming a light

or yellowish-green colour. The cause for this condition is ascribed to the fact that the plants being such greedy feeders, have used up a great portion of the available nitrogen the first season, and consequently lacked a sufficient supply for the second year's growth. During this second season, spots from one to two feet in diameter may be observed where the foliage is a rich dark green, and the plants are taller than the majority of those in the field. Where these dark healthy spots are, no doubt bacteria are present, being introduced by the germs being on individual seeds or on foreign matter in the seed, or possibly were present in the native soil, having previously lived on the native vetches or peas.

The presence of the bacteria on the roots of alfalfa is indicated by small whitish nodules, about the size of a pin head or smaller. These often form in clumps, resembling somewhat a miniature bunch of grapes, and are more often found on the newer roots. When looking for these bunches, great care should be taken or they will be entirely stripped from the roots as the plant is lifted.

It has been found that it often pays to inoculate the soil with these bacteria when the seed is sown, for fields thus inoculated do not assume the unthrifty appearance the second season that fields not so treated are very apt to put on. The usual practise here in inoculating has been to use soil from an old alfalfa field. This is sown on the land at the rate of from 100 to 200 pounds per acre and worked in as the seed bed is prepared. The soil taken from an area where Sweet Clover (*Melilotus alba*) is growing, may also be used successfully for inoculating.

It does not follow that inoculation is an essential to the successful growth of alfalfa, although the field may remain unprofitable for one to two years, due to the lack of it. In fields not inoculated, the dark vigorous spots, above referred to, get gradually larger. This is quite noticeably so after an irrigation, as the water seems to be a particularly good means of distributing the germs. The writer has seen fields not inoculated remain sickly looking and unthrifty for a number of years. While other fields not inoculated but sown on well prepared land and given careful attention were in a vigorous, thrifty condition at the end of the second season. It is safe to assume that inoculation will be an important aid to the first trial field in one's district, or on one's farm.*

SEED.

All large seed-houses carry alfalfa seed in stock, and care should be taken in buying that the best is selected. The variety known as Turkestan is supposed to be somewhat more hardy than the common variety, although it so closely resembles the common alfalfa that even experts are sometimes unable to distinguish it from the common variety when grown side by side. Northern grown seed should be obtained, if possible. In this district, however, no appreciable difference in results, due to the source of the seed supply, has yet been noticed.

QUANTITY OF SEED PER ACRE.

On irrigated land, 20 pounds of seed per acre is recommended; where land is not to be irrigated, somewhat less than this might do.

DATE OF SEEDING.

From the middle to the last of May is, perhaps the best time to sow alfalfa here, although early in June is usually quite satisfactory.

*The Experimental Farm at Lethbridge will supply applicants free with 100 pounds of inoculated alfalfa soil (f.o.b., Lethbridge, which will be billed out as fertilizer. The applicant will have to pay the freight from Lethbridge.

DO NOT SOW WITH A NURSE CROP.

It is well to remember that alfalfa originally was a tropical plant, and although it has wonderful adaptability, it is somewhat tender, while young, under our conditions.

It welcomes sunshine and warmth, consequently it does not do as well when shaded by a growing crop of grain. It has been aptly expressed that the nurse crop might more properly be termed a murder crop.

TREATMENT THE FIRST SEASON.

It is quite important that the young plant should be clipped once or twice the first season. This serves not only as a check to the weeds, but tends to make the plant more stocky. When not cut, the alfalfa plants, if they are fortunate enough not to be choked completely out by the weeds, often form blossoms, and put their energy into forming or starting to form a seed pod, while this energy should be devoted to root development, which is the result when the plants are cut occasionally. A good time to make the first cutting is when the plants and weeds are from six to ten inches high, and usually occurs late in June or in July. The last cutting in the first season should not be later than the middle of August. It is immaterial whether these light cuttings be raked off or not, for if not too heavy they serve an excellent purpose in acting as a mulch. If irrigation is to be practised, the field should be wet when the plants indicate that they require moisture, but not before. One irrigation the first season is usually sufficient, although an additional flooding late in the autumn has sometimes been found beneficial.

CURING THE HAY.

To get the best quality of hay, particular care must be given alfalfa in curing and handling it. The first point of importance to remember is, that it must be cut young, for at this stage in its development it is more nutritious as well as more palatable. As soon as blossoms appear, alfalfa is ready to cut, or as expressed by some, when one tenth of the field is in bloom. The hay should be raked as soon as possible after cutting, and immediately put in cocks. Curing it in the cock in this way prevents the leaves from breaking off, which is quite important when it is considered that much of the nourishment is in the leaves. A practice highly spoken of by those who have tried it, is to follow immediately behind the mowing machine with the rake, which will gather the hay perfectly, although if it is allowed to remain half an hour or so and wilt, the rake could not pick it up. This is immediately put in small cocks and allowed to remain till cured. In this way all the juices are retained in the most acceptable manner, making the hay extremely palatable. The only possible objection is that it takes a day or two longer to cure, which is a disadvantage in showery weather.

In the Lethbridge district, it has been customary to cut the alfalfa three times; the first cutting usually occurring about June 20th to the 25th; the second the first week in August, and the third cutting, about the time of frost. From observation, the writer has been led to believe that very late cutting may not always be wise, notwithstanding the fact that up to the present time it has been practised.

RAISING SEED.

The seed crop varies greatly and seems to be quite uncertain in all countries, though certain localities seem to be favoured in this respect much more than others. A small quantity of seed has been grown in Southern Alberta, but so

far, the yields appear to be small. Time is the only thing that will determine whether our district is well suited to the growth of alfalfa seed. It is quite probable that irrigation is not required for this phase of alfalfa culture. The stand should be very thin to allow the blossoms to form and mature well down on the stems, otherwise the yield of seed is apt to be small.

MIXTURES.

Mixtures of alfalfa and grasses, such as Timothy, Brome Grass, and Western Rye Grass have been eminently successful, the grasses growing much more vigorously than when grown alone, and the alfalfa growing apparently almost as well as when sown by itself. The grasses being shallow rooted, and the alfalfa deep rooted, it is but natural that they would not interfere with each other, and the grasses thrive on the fertility added to the soil through the growth and decay of the alfalfa roots. But two crops in a season are obtained from these mixtures, owing to the fact that the grasses are not ready to be cut until sometime in July. The crops are, however, sufficiently heavier to compensate in great measure for the loss of the third cutting. After the first cutting, the grasses do not make much growth, consequently the second cutting is clear alfalfa. The only objection so far found to these mixtures, is that the grasses are apt to crowd the alfalfa out, the stand of alfalfa becoming thinner.

It would seem advisable in starting these mixtures to sow but a small quantity of grass seed, say from two to four pounds per acre, and reduce but little the amount of alfalfa seed. So far the alfalfa has been mixed with but one grass, as alfalfa and timothy, or alfalfa and brome grass, &c. A satisfactory method has been to sow the alfalfa alone, and in the spring of the second year, harrow in the grass seed, for it has been found that occasionally the grass seed is so much more vigorous the first and second seasons than is the alfalfa, that it seriously thins the stand of the latter at the very beginning.

LATE FALL IRRIGATION.

Late fall irrigation appears to be very advantageous. It saturates the ground for the winter, and rapid growth is made as soon as growing weather comes in the spring, and no irrigation is required to make a maximum yield of the first cutting; while irrigating the alfalfa early in the spring sometimes checks the growth for a time, due to the ground being made cold from excess of moisture.

DISCING.

In recent years, in alfalfa-growing districts, the practice of discing the alfalfa fields is becoming quite common. The discs are set at a slight angle and, if necessary, the implement is weighted. The object is to split the crown about two inches down. This should be done early in the spring, just after the frost has disappeared. It may also be done after each cutting is made.

On dry land the discing has a particular advantage, for this cultivation is a great aid in conserving moisture.

LIFE OF AN ALFALFA FIELD.

In districts where the plant thrives, it is hard to say how long a life it may have. The writer has seen fields in Colorado that had been producing hay for twenty-five years and they seemed just as thrifty and produced apparently just as luxuriant a growth as did neighbouring fields that were many years younger.

In California fields are reported to be yielding well that are over fifty years old.

Under our conditions here, it seems quite evident that it would be better to allow the fields to remain seeded down for a number of years, say not less than five or six at the least, for the reason that it takes two years or more for them to become well established. It has been observed that fields four or five years old yield better than those but two or three years old.

TO SUMMARIZE BRIEFLY.

Use summer fallow land or land in which root crops have been grown the previous season. Do not plow it, but prepare a good shallow seed bed.

Inoculate the land with about 100 to 200 pounds of soil from an old alfalfa field, and work in while the seed bed is being prepared.

Sow the seed in the latter part of May or early in June at the rate of 20 pounds per acre, on irrigated land; less on dry land.

Do not use a nurse crop.

The first season do not neglect to run the mowing machine over the land before the weeds get too high, and cut it a second time if practicable.